Alternative 15

West-Side Sacramento Storage and Conveyance Facility

E-008983

Alternative 15

West-Side Sacramento Storage and Conveyance Facility

Emphasis

This alternative consolidates all major diversions on the Sacramento River and in the Delta to Shasta Lake and the Lake Oroville Forebay, conveys water along the west side of the Sacramento Valley to off-stream storage reservoirs, groundwater storage, and to south Delta pumps.

Distinguishing Features

Physical and Structural Features

Includes the construction of diversion facilities at Shasta Lake and the Lake Oroville Forebay, conveyance facilities between these diversions and several new large storage reservoirs on the west side of the Sacramento Valley and, ultimately, to the south Delta export pumps. The west-side conveyance facility would also be connected to current Sacramento River diverters. A high level of habitat restoration would be undertaken in the Bay, the Delta, and in the Sacramento and San Joaquin Rivers. A moderate levee improvement program would be conducted, with all levees receiving improvements, and critical levees receiving considerable improvement.

Operational and Management Features

Would capture water spilling from Lake Shasta and Lake Oroville and convey it to new reservoirs and groundwater storage on the west side of the Sacramento Valley. Reservoirs would be managed to provide improved flows and temperatures for fish. Improve the water quality of the rivers and Delta by retaining storm water runoff, storing agricultural drainage water, remediating mine drainage, improving pollutant source controls, and constructing wetlands to maximize opportunities for groundwater reclamation and recharge and conjunctive use. Obtain 100 TAF on San Joaquin River and manage for environmental purposes.

Institutional and Policy Features

Groundwater banking and conjunctive use would be encouraged to facilitate the success of the west-side storage program. Increase instream flows through a variety of programs involving water conservation, reclamation, acquisition, and desalination.

Benefits

- Improves quality of export water
- Improves flood control and system reliability
- Reduces entrainment impacts on Sacramento River and in Delta
- Improves control of flows and temperatures in rivers
- Reduces impacts on anadromous fish from migration obstructions
- High level of Bay, Delta, and river habitat restoration

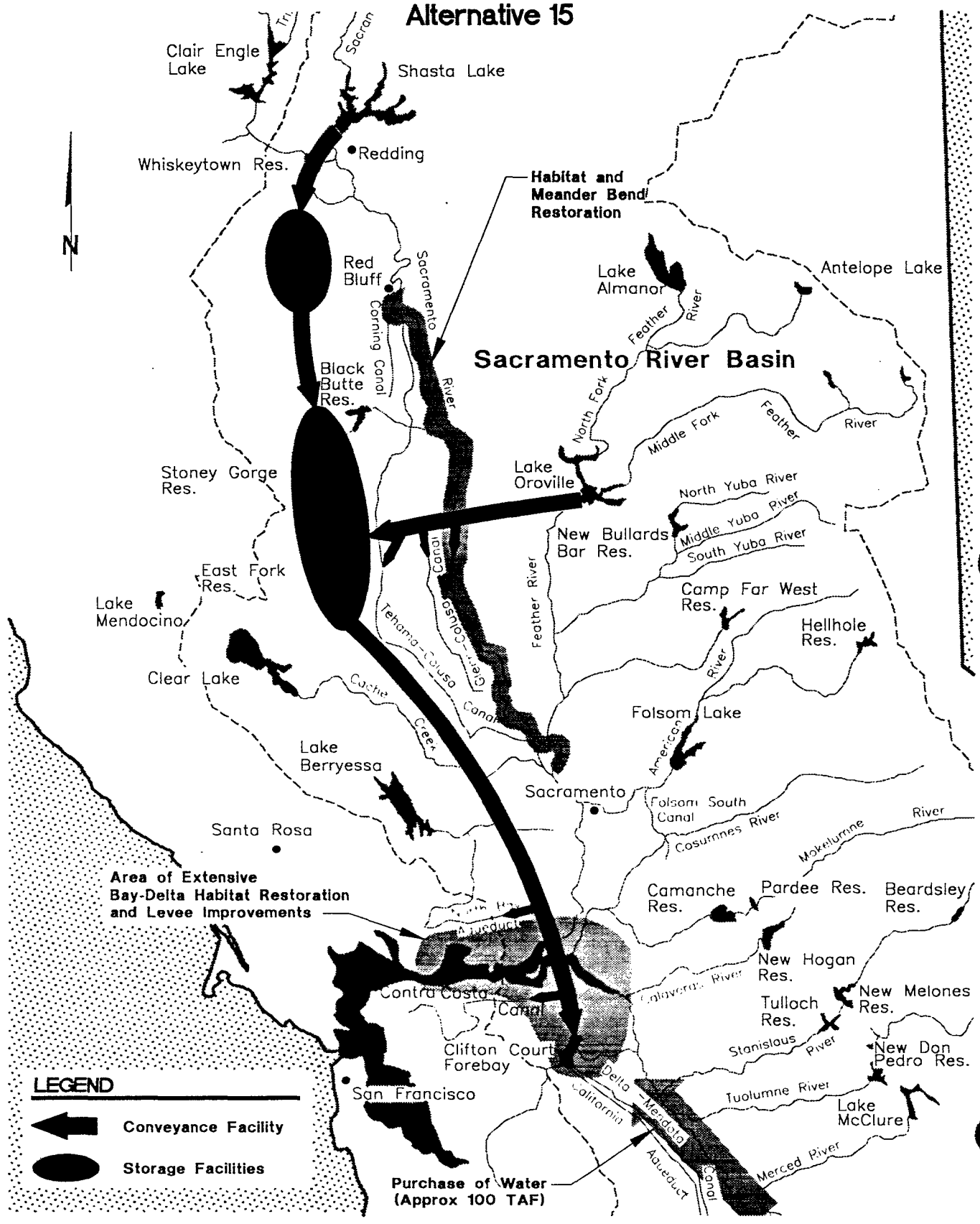
Constraints and Concerns

- Extremely high cost
- Salmon migration may be affected
- Environmental impacts associated with new storage reservoirs and conveyance facilities
- Bay habitat restoration could result in loss of terrestial habitat

PRELIMINARY DRAFT

Large Westside Sacramento Storage and Conveyance Facility

Alternative 15



Alternative 15

West-Side Sacramento Large Storage and Conveyance Facility

This alternative enhances fisheries, resources, and water supply by providing additional water supplies to the Delta during critical periods and by diverting, storing, and conveying a percentage of flood waters in the Sacramento and Feather River systems. Major diversions now impacting fisheries in the Sacramento River would be relocated and consolidated to upstream locations that would reduce or eliminate the fisheries impacts and improve the water quality of the water diverted. Flood flows would be stored in new carry over storage facilities that would provide a higher degree of water supply reliability and flexibility of system operation of existing reservoirs. The conveyance system would link and provide flexibility for conjunctive use between surface and groundwater storage and urban, agricultural, and environmental beneficial uses. The conveyance system would terminate at the current south Delta pumps, thus eliminating the impacts of pumping on the south Delta. Habitat restoration, and enhancement in the Delta and River system and tributaries would be developed in concert with the new operational flexibility of the existing and the new reservoirs to enhance fish and wildlife. Vulnerability of Delta functions to catastrophic failure would be protected by the new facility in combination with flood way and levee improvements. In Delta water quality will be enhanced by Best Management Practices in the watershed and source control for point and non-point discharges.

Diversion conduits from Shasta Lake and Lake Oroville would be used to convey a small fraction of the flood flows to reservoir sites for "banking" on the west side of the Sacramento valley. Water would be diverted only when the reservoirs are spilling. With a cross-valley conduit from Oroville to the west side reservoirs this concept could substantially increase water supply to the Delta.

Physical and Structural Features

Consolidate and Relocate Diversions— Construct new diversions at Shasta Lake and Lake Oroville with capacities to capture significant wet weather flows that would other wise be released for flood control. For this alternative the diversion at Shasta would be sized between 5,000 and 10,000 cfs while the Oroville diversion capacity would be between 2,000 to 7,000 cfs.

Develop Additional Off-Stream Storage— Develop approximately 10 million ac-ft of new storage capacity at off-stream reservoir sites on the westside streams between Shasta and Lake Berryessa. Potential reservoirs such as the Colusa-Sites would be linked together by a new westside conveyance system. The reservoirs would be operated to supply westside agricultural irrigation water, and exports from the Delta for agriculture, municipal and industrial uses and to the Sacramento River and tributaries environmental beneficial uses.

Develop Conveyance Facilities— Develop conveyance facilities to connect the diversions to west-side storage facilities. From the storage facilities connect to the Tehama-Colusa Canal, Glenn-Colusa Irrigation District, possibly the North Bay Aqueduct, and a cross-Delta Transfer facility. Provide facilities to groundwater conjunctive use areas on the west and east sides of the valley.

Construct An Isolated West-Side Cross-Delta Facility— Construct an isolated conveyance system that connects the west-side storage projects to the California Aqueduct and the Delta Mendota Canal. The capacity of the facility would approximately equal that of the California Aqueduct and Delta Mendota Canal combined. (Around 15,000 to 20,000 cfs).

Delta Levee Habitat Restoration— Restore approximately 100 levee miles of shallow water, riverine and riparian habitat in the Delta to provide forage and cover habitat for resident and anadromous fish, and to provide other benefits associated with riparian habitat. Actions might include setback levees, creation of berms, creation of shallow water habitat, and increased vegetation on levees in coordination with flood control improvements. Considerations for site selection will include distance from hazards such as pumping plants, protection from waves generated by wind and boat wakes, importance of island integrity to the maintenance of Delta water quality, and need to improve channel capacity and structural stability of levees. Good candidate areas are Twitchell Island along Three Mile Slough and Seven Mile Slough, Georgiana Slough, and the north and south forks of the Mokelumne River.

Delta Habitat Restoration— Restore shallow water and tidal wetland habitat in the Delta to provide spawning areas, forage areas, and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Candidate areas include Prospect Island, Liberty Island, Little Holland Tract, Hastings Tract, Yolo Bypass, and the southeast Delta. Also restore shallow water shoreline habitat along margins of the lower Sacramento and San Joaquin channels, and tributary sloughs including Georgianna Slough, Barker Slough, Lindsey Slough, and Parker Island. Riparian, wetland, and terrestrial habitat would also

be restored on Delta islands and upland areas adjacent to river channels (such as Decker Island).

San Joaquin River Habitat Restoration— Restore channel features to improve fish survival. Actions may include restoration of deeper, narrower channel areas to keep water cooler, and isolation of quarry areas to protect young fish from predation and straying.

Bay Habitat Restoration— Restore about 2,000 acres of tidal wetlands between Collinsville and Carquinez Strait. Actions may include conversion of diked wetlands to tidal wetlands or use of dredge spoils to create wetland areas. The resulting habitat types will provide wet year spawning habitat for Delta smelt, rearing areas for salmon, as well as habitat for diverse wildlife including canvasback and redhead ducks.

Channel Islands— Restore and protect channel islands. Evaluate contribution of upstream meander belts to sediment deposition at channel islands. Establish zones for different types of boating use so some areas are protected from large boat wakes.

Install Bypass at Mouth of Old River— Construct a bypass at the mouth of Old River that will encourage outmigrants to stay in San Joaquin River while allowing a managed flow down Old River.

Fish Screens— Install fish screens on diversions over 250 cfs that are on fish migration routes in the Delta, rivers, and tributaries.

Other Programs— Implement recommended habitat restoration actions from other programs, such CVPIA and the Anadromous Fish Restoration Plan. Examples of specific actions might include small dam removal on Clear Creek, dam removal on Battle Creek, establishment of a population of winter run chinook salmon on Battle Creek.

Sacramento River Habitat Restoration— Restore riparian, shaded riverine, and shallow water habitat along the Sacramento River from Sacramento to Collinsville. First step will be to provide matching funds for Corps of Engineers feasibility study. Subsequent restoration would be funded 75% by COE.

Flood Protection Level— This action provides a moderate level of protection to Delta system levees. First, all levees not yet providing a level of protection equivalent to the hazard mitigation plan (HMP) will receive the necessary upgrades to their levees to meet HMP standards. A level of flood protection equivalent to the US Army Corps of Engineers' Public Law (PL)- 99 standard would be provided to: 1) critical western Delta

islands (such as Sherman Island), with important regional infrastructure (e.g. the Mokelumne Aqueduct, transmission lines, Highway 160, etc.); 2) other islands having infrastructure of local importance (such as New Hope Tract, Bouldin Island, Palm Tract, Lower and Upper Jones Tracts, and Lower Roberts Island); and 3) islands having valuable habitat, but not necessarily infrastructure, (including, but not necessarily limited to Canal Ranch, Brack Tract, Staten Island, Venice Island, Rindge Tract, Webb Tract, Big Mandeville Island, Twitchell Island, and Bradford Island).

Channel Improvements and Levee Maintenance— A moderate level of channel improvements (e.g. widening for improved conveyance), levee maintenance and stabilization (e.g. stabilizing berms), the modification of agricultural practices to reduce subsidence potential, setback levees, and providing funding for maintenance and stabilization are indicative of the range of actions that would be implemented with the intent of reducing the risk of the Delta levee system with respect to its value in providing water supply, water quality, ecosystem quality, and land use/infrastructure benefits.

Retain and Manage Stormwater Runoff— Create wetlands, buffer strips, treatment processes, or holding reservoirs to reduce contaminant concentrations and to store or retard contaminated flows and stormwater drainage for release during periods of higher instream flows.

Constructing Wetlands— Utilize wetlands for natural treatment and detention to reduce contaminant concentrations and make releases during periods of higher instream flows.

Operational and Management Features

Modify Reservoir Operations— Reoperate Shasta Reservoir and Oroville Reservoir to provide high flow diversion to westside storage facilities and to manage flows and temperatures in river fisheries habitats.

Real time Monitoring— Establish adequate real-time monitoring to determine location of species of special concern so that project operations can be effectively managed to reduce losses of fish and minimize effects on habitat.

Acoustic Barrier at Mouth of Georgiana Slough— Operate an acoustic barrier at the mouth of Georgiana Slough for anadromous fisheries. Work to improve the effectiveness of behavioral barriers. Evaluate use of acoustic barriers at the Delta Cross Channel and 3-Mile Slough.

Storage of Agricultural Tile Drain Water— Develop a program with irrigation districts to store tile drain water to be released at times when pulse flows can provide dilution.

Implement a Subsidence Management Program— Develop and implement a very long-term subsidence management program that prescribes land use strategies related to the degree of subsidence. For some deep Delta islands (below -10 feet in elevation) eliminate traditional agriculture in favor of seasonal wetland management to stop and reverse subsidence. At elevations from -10 to -3 feet, stabilize subsidence by rotating seasonal wetland with wildlife-friendly agricultural use. At elevations from -3 to +3 feet, maintain agricultural uses on some parcels, identify other areas for restoration to tidal wetlands.

Mark Hatchery Fish— Mark salmon produced in hatcheries to facilitate selective catch of hatchery fish by commercial and recreation fisheries in order to increase natural (wild) populations.

Pen Rearing of Striped Bass— Rear striped bass in pens to maintain recreational fishery and avoid operational constraints on water projects due to spawning bass.

Response Program for Introduced Species Control— Establish and fund a rapid response program among environmental agencies to provide a fast and effective means of managing non-native species introduced to the Bay-Delta. Carry out continuing management programs for nuisance species such as water hyacinth.

Improve Pollutant Source Controls— Existing source control regulations for pollutants may not be sufficiently comprehensive nor enforced to levels required to protect beneficial uses in the Bay-Delta system and tributary rivers. These actions would provide for an array of increased source reduction activities such as additional regulation of agricultural and urban drainage and better enforcement, establishing BMP's for a range of activities affecting Delta water quality such as levee maintenance and pest control practices, and supporting and enhancing existing land retirement and fallowing programs. Using a watershed management approach, identify and control high priority pollutant sources through a combination of source reduction and treatment actions.

Intense application of core level actions such as implementing source control regulations for pollutants, retirement of lands with serious drainage disposal problems, retirement or fallowing agricultural lands with salt or other contaminant drainage problems to reduce land-derived salt contamination, management of irrigation tailwater, retention and management of stormwater runoff, and management of discharges from abandoned mining sites would improve water quality management.

Examples of best management practices to be applied in the watersheds include land fallowing in areas with agricultural drainage problems, and integrated pest management. Source control can reduce the mass loads of contaminants entering the Delta system, however, not all contaminants can be prevented from entering the Delta. Better management of pollutant flows (such as agricultural return flow treatment and construction of wetlands as filtration systems) also will reduce the influx of pollutants into the aquatic system.

Implement on-site mine drainage remediation measures based on requirements in current regulations. Provide regulatory incentives and develop institutional agreements to enable focusing resources on priority sources. Through changes in water pollution requirements give urban areas flexibility to fund high-priority mine cleanup in lieu of increasing expenditures on treatment plant improvements.

Control Volume of Agricultural Discharges— Selected agricultural water quality management measures, such as those directed at drainage volume control, can reduce agricultural water demands and increase in-Delta flows.

Manage Irrigation Tailwater to Reduce Pesticides— Utilize wetlands, treatment processes, or holding reservoirs to store or retard surface agricultural drainage, reduce pesticide concentrations, and/or make releases during higher instream flow periods.

Obtain Environmental Water— Obtain about 100,000 acre feet from San Joaquin water users to reduce conflicts between fisheries and diversions. Water could be used to provide pulse flows to move Delta smelt downstream, away from diversion points. Another use might be dilution of poor quality San Joaquin River flows, providing benefits for fisheries, water supply, and water quality. New south-of-Delta storage would allow this water to be used as exchange water so that Delta diversions could be reduced at critical times to protect fisheries without affecting export supplies.

Institutional and Policy Features

Encourage Groundwater Banking and Conjunctive Use— In order to maximize the opportunity for groundwater reclamation and recharge, and conjunctive use with the westside surface storage, encourage and provide the conveyance facilities to aquifers such as the Butte Creek and Stoney Creek Basins.

Water Quality Standards— Maintain current standards for Delta water quality and position of X2.

Preserve Agricultural Land Uses— Establish programs to preserve agricultural land uses that help to protect the ecosystem. Examples include limiting levee restoration to levels that are inadequate to permit residential construction on Delta islands, and incentive programs to preserve habitats such as pasture, which is important for sandhill cranes.

CALFED Regulatory Team— Determine how to implement a regulatory team to facilitate getting permits for environmental restoration projects. Each member agency would have a key person on team.

Dredge Materials— Establish a policy that all future clean dredge material out of the Delta above Chipps Island should go into Delta restoration and/or levee improvement projects.

Safe Harbor for Maintenance— Encourage farmers and levee maintenance districts to leave habitat areas undisturbed when feasible by providing variances from ESA regulations.

Reduce Water Demand on Delta and Increase In-Stream Flows— Use a variety of actions involving increased agricultural, municipal, and industrial conservation and reclamation; acquisition of supplemental water; and expanded use of desalination with the intent of relocating the conserved supplies for use as in-stream dilution flows and to reduce salinity levels. Conservation strategies would include encouraging land fallowing and water pricing measures. The conserved supplies would then be available to provide water quality protection through dilution and habitat improvements such as improved temperature and pulse flows during critical migration periods.

Improve Natural Flood Protection— Enhance levee flood protection and create new habitat by allowing rivers to meander, relocating levees to create floodways, and modifying floodways to support wetland habitats.

Subsidence Reduction— Efforts to reduce the subsidence on Delta islands with deep peat soils (such as parts of Grand, Twitchell, Sherman, Andrus, and Bouldin islands) will include the establishment of a landside buffer zone between 50 and 100 yards in width, located adjacent to the levee.

Emergency Levee Management Plan— An emergency levee management plan would provide necessary funding and direction to reclaim Delta islands in the event of inundation to continue protection of Delta functions as an integrated resource system.

Funding would be provided to ensure that a suitable amount of equipment and materials would be readily available to rapidly respond to flood fights.

Preliminary Assessment

Benefits

Ecosystem Quality— This alternative would greatly enhance ecosystem quality by eliminating the impacts of the major diversions and providing more opportunity for managing flows and temperature in the Sacramento River and upstream tributaries. The elimination of the export pumps in the south Delta along with habitat restoration and enhancement in the Delta and the river system will improve fish production.

Water Supply Reliability— This alternative would improve water supply reliability by providing additional storage for critical periods for Urban, Agriculture and Environmental uses. Substantial new supply would be available to the Delta. Because the major diversions are all moved off the Sacramento River and Delta the reliability will greatly improve.

Water Quality— The water quality of exports would be greatly improved from the diversion of higher quality in the upstream areas. This alternative will improve water quality by implementing actions which limit pollutants at the source and better manage the system to control contaminants before they are released into receiving waters.

System Reliability— Channel improvements and levee maintenance and stabilization actions at moderate levels further improve the reliability of the Delta from catastrophic inundation which protects existing and restored shallow water habitat, land uses, infrastructure, water supply and water quality. Continued protection of Delta functions as an integrated resource system is accomplished by an emergency levee management plan to provide necessary funding and direction to reclaim Delta islands in the event of inundation. These actions could be accomplished through expansion and continuation of existing programs such as the Delta Flood Protection Act of 1988 (SB 34) as well as sufficient funding of these efforts in the future.

Constraints and Concerns

Ecosystem Quality— This alternative diverts a small portion of the flood flows in the Sacramento and Feather River systems. Decisions have not been made about how much and what part of the flood hydrograph, and what kind of water years these flows can be diverted and still protect the ecosystem in the Delta and Bay. Pulse flows needed to stimulate salmon in- and out- migration may be affected.

New large westside storage is a key component of this alternative. If any of the major reservoir sites contain endangered species it may cause abandonment of the alternative.

Bay habitat restoration could result in loss of terrestrial habitat.

Water Supply— The storage of water in the westside reservoirs would result in a large evaporation losses during the summer months.

Cost— Because of its size this is a high cost project. It may have to be implemented in stages to make it feasible.